

Product Summary

$V_{(BR)DSS}$	$R_{DS(on)MAX}$	I_D
60V	11mΩ@10V	48A
	16mΩ@4.5V	

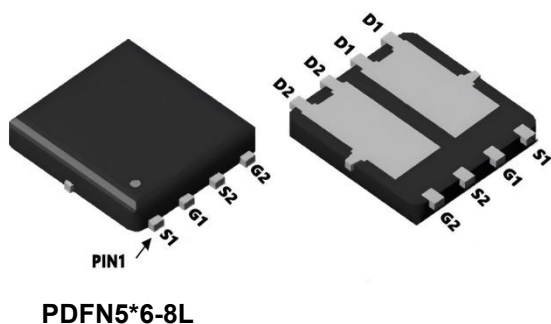
Feature

- Excellent package for heat dissipation
- High density cell design for low $R_{DS(ON)}$
- Suffix "-Q1" for AEC-Q101

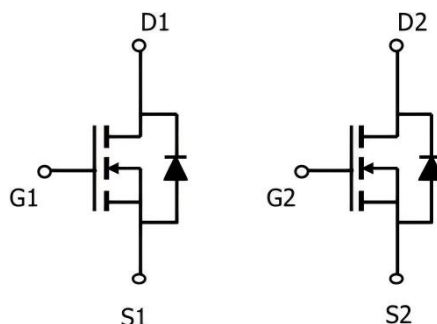
Application

- Engine management systems
- Body control electronics
- DC-DC convertor

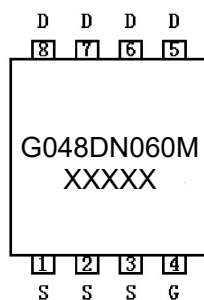
Package



Circuit diagram



Marking



Absolute maximum ratings ($T_J=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Continuous Drain Current ^{1,3)} ($T_C=25^{\circ}\text{C}$)	I_D	48	A
Continuous Drain Current ^{1,3)} ($T_C=100^{\circ}\text{C}$)	$I_D (100^{\circ}\text{C})$	30	A
Pulsed Drain Current ¹⁾ ($T_C=25^{\circ}\text{C}, t_p=100\mu\text{s}$)	I_{DM}	170	A
Single Pulse Avalanche Energy ²⁾	E_{AS}	35.4	mJ
Power Dissipation ^{1,3)} ($T_C=25^{\circ}\text{C}$)	P_D	44	W
Thermal Resistance Junction to Case	$R_{\theta JC}$	2.8	$^{\circ}\text{C}/\text{W}$
Operating Junction Temperature	T_J	$-55 \sim +150$	$^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	$-55 \sim +150$	$^{\circ}\text{C}$

Electrical characteristics ($T_J=25^{\circ}\text{C}$, unless otherwise noted)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-source breakdown voltage	V _{(BR)DSS}	V _{GS} =0V, I _D =250μA	60			V
Zero gate voltage drain current	I _{DSS}	V _{DS} =60V, V _{GS} =0V			1	μA
Gate-body leakage current	I _{GSS}	V _{DS} =0V, V _{GS} =±20V			±100	nA
Gate threshold voltage	V _{GS(th)}	V _{DS} =V _{GS} , I _D =250μA	1.3	1.8	2.4	V
Drain-source on-resistance	R _{DS(on)}	V _{GS} =10V, I _D =20A		8.6	11	mΩ
		V _{GS} =4.5V, I _D =15A		11.9	16	
Dynamic characteristics ⁴⁾						
Input Capacitance	C _{iss}	V _{DS} =30V, V _{GS} =0V, f =1MHz		880		pF
Output Capacitance	C _{oss}			320		
Reverse Transfer Capacitance	C _{rss}			15.7		
Total Gate Charge	Q _g	V _{DS} =30V, V _{GS} =10V, I _D =23A		15.2		nC
Gate-Source Charge	Q _{gs}			3.2		
Gate-Drain Charge	Q _{gd}			3.4		
Turn-on delay time	t _{d(on)}	V _{DS} =30V, V _{GS} =10V, I _D =23A R _G =2.7Ω		9		nS
Turn-on rise time	t _r			51		
Turn-off delay time	t _{d(off)}			20		
Turn-off fall time	t _f			6		
Source-Drain Diode characteristics						
Diode Forward Current	I _S				48	A
Diode Forward voltage	V _{SD}	V _{GS} =0V, I _S =20A			1.2	V
Reverse Recovery Time	T _{rr}	I _F =23A, di/dt =100A/μs		17.3		nS
Reverse Recovery Charge	Q _{rr}			9		nC

Notes:

- 1) The entire application environment impacts the thermal resistance values shown, they are not constants and are only valid for the particular conditions noted.
- 2) $T_J=25^{\circ}\text{C}$, $V_G=10\text{V}$, $R_G=25\Omega$, $L=0.5\text{mH}$, $I_{AS}=11.9\text{A}$.
- 3) Thermal resistance from junction to soldering point (on the exposed drain pad).
- 4) Guaranteed by design, not subject to production.

Typical Characteristics

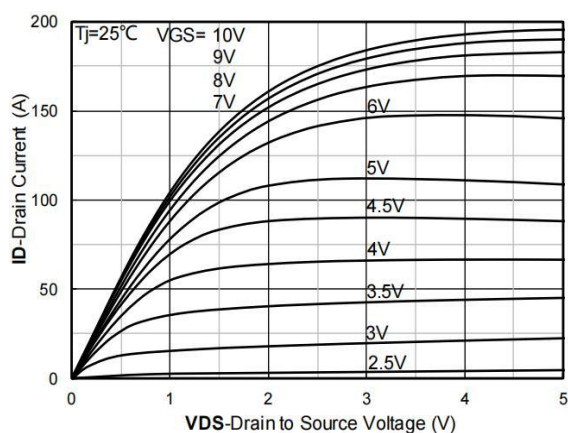


Figure 1. Output Characteristics

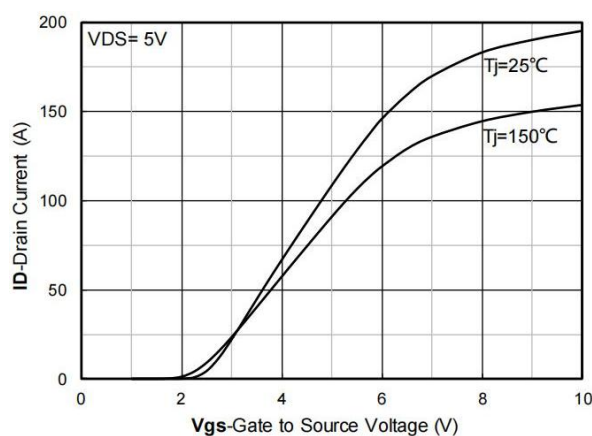


Figure 2. Transfer Characteristics

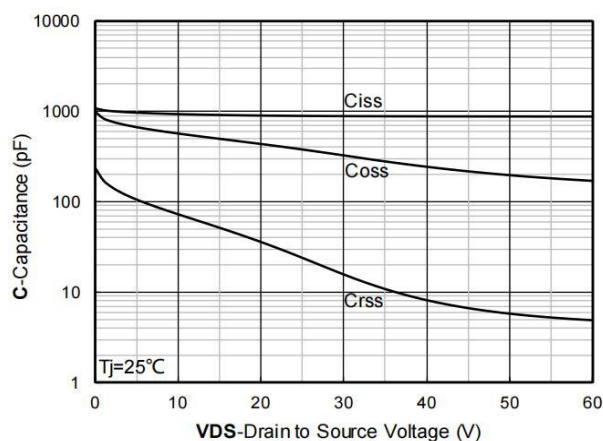


Figure 3. Capacitance Characteristics

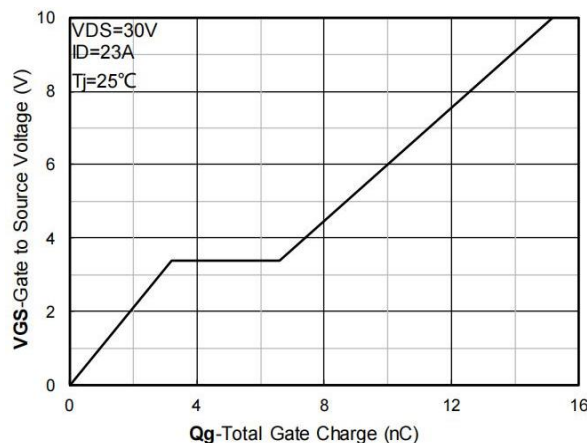


Figure 4. Gate Charge

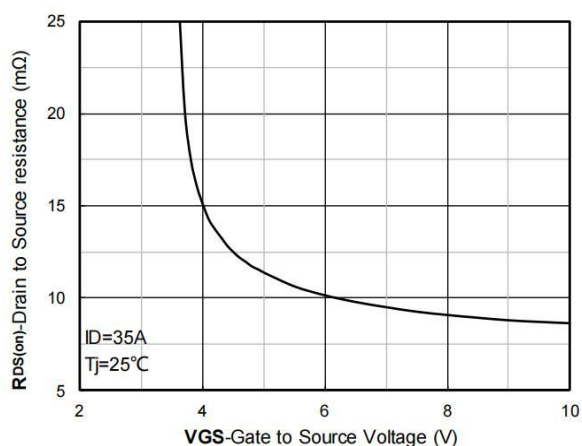


Figure 5. On-Resistance vs Gate to Source Voltage

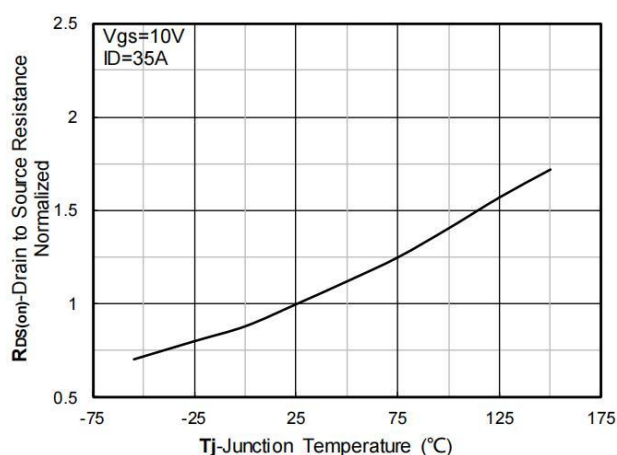


Figure 6. Normalized On-Resistance

Typical Characteristics

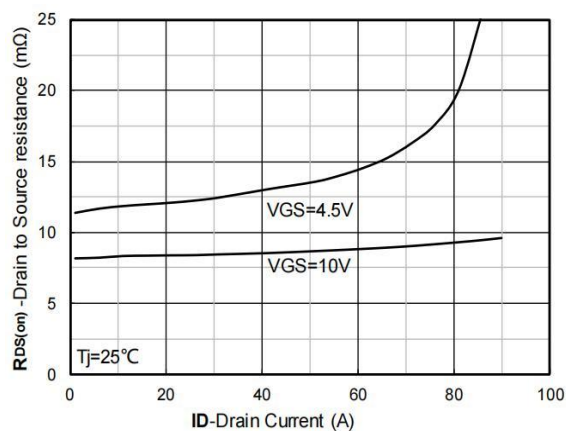


Figure 7. RDS(on) VS Drain Current

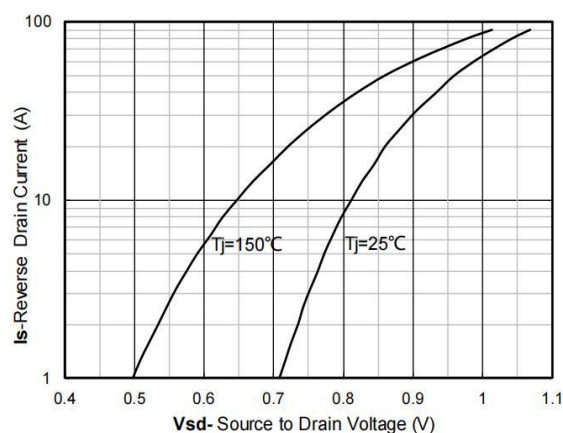


Figure 8. Forward characteristics of reverse diode

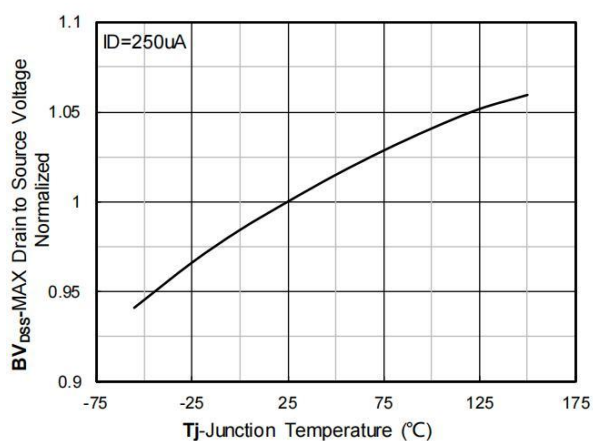


Figure 9. Normalized breakdown voltage

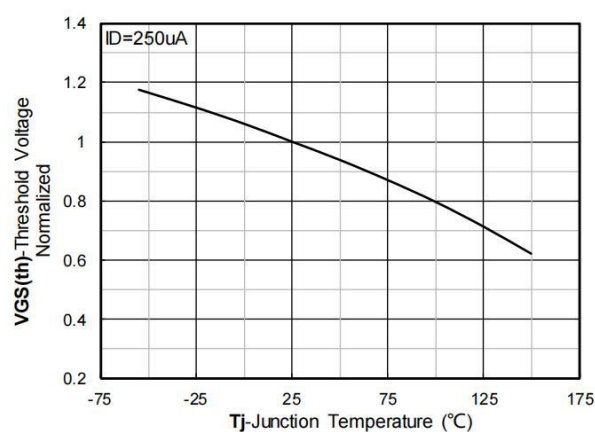


Figure 10. Normalized Threshold voltage

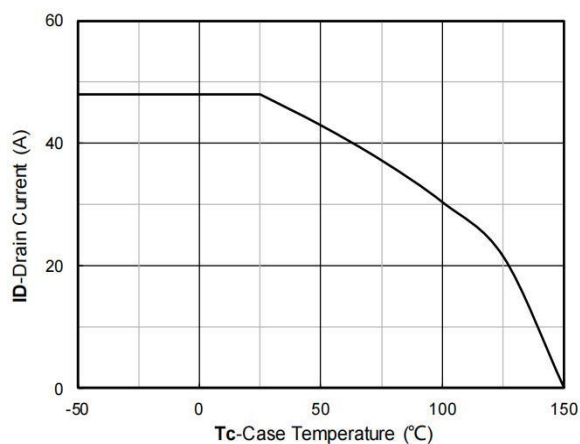


Figure 11. Current dissipation

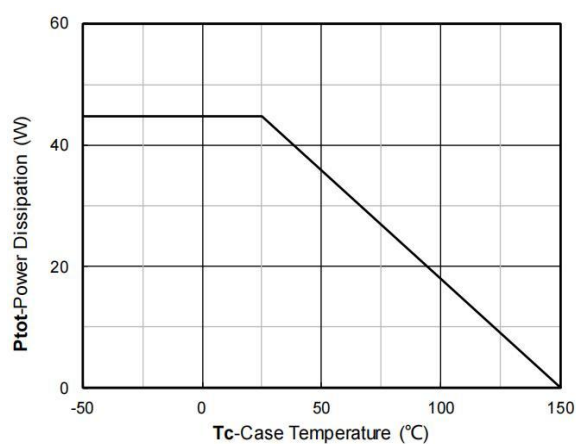


Figure 12. Power dissipation

Typical Characteristics

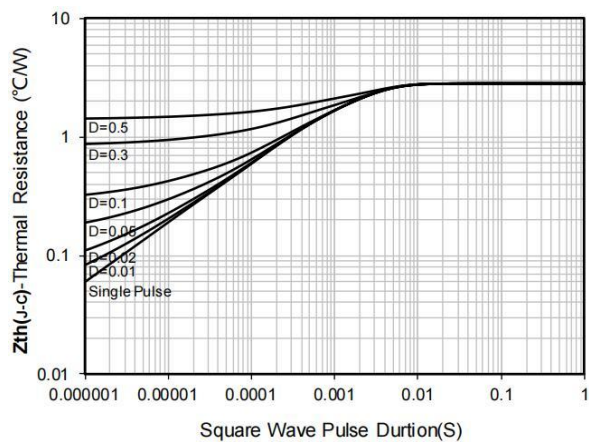


Figure 13. Maximum Transient Thermal Impedance

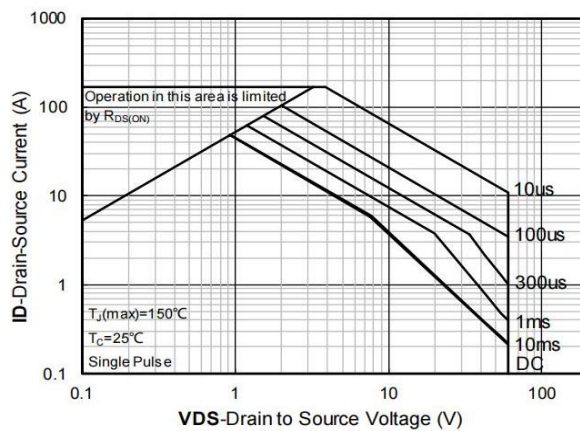
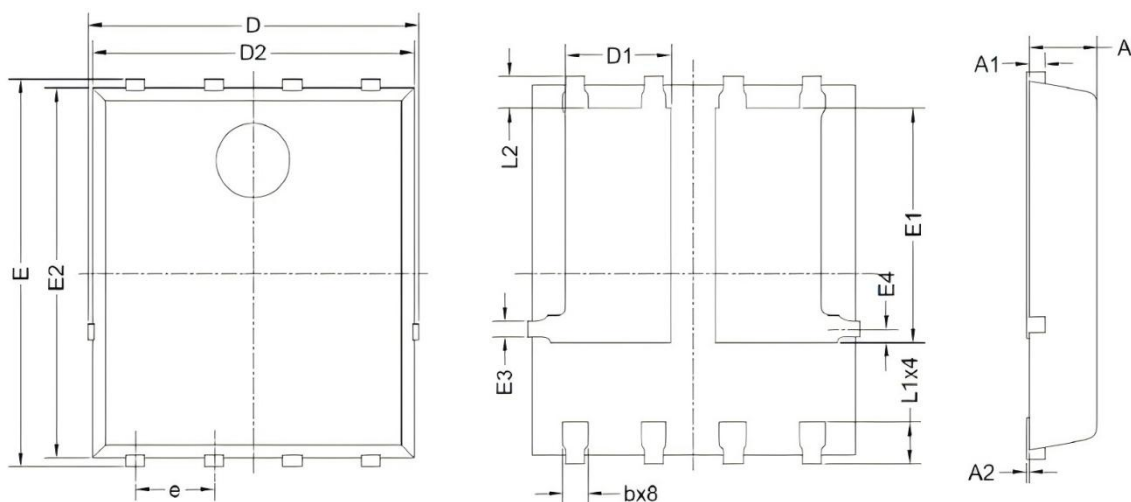


Figure 14. Safe Operation Area

PDFN5*6-8L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
D	5.150	5.550	0.203	0.219
E	5.950	6.350	0.234	0.250
A	1.000	1.200	0.039	0.047
A1	0.254 BSC.		0.010 BSC.	
A2	0.000	0.100	0.000	0.004
D1	1.500	1.900	0.059	0.075
E1	3.520	3.920	0.139	0.154
D2	5.000	5.400	0.197	0.213
E2	5.660	6.060	0.223	0.239
E3	0.254 REF.		0.010 REF.	
E4	0.210 REF.		0.008 REF.	
L1	0.560	0.760	0.022	0.030
L2	0.500 BSC.		0.020 BSC.	
b	0.310	0.510	0.012	0.020
e	1.270 BSC.		0.050 BSC.	